Strait Flow Monitoring Using Trawl Resistant Bottom Mounted Acoustic Doppler Current Profilers

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LONG-TERM GOALS

The long-term goal is to determine the seasonal reversal South China Sea – Indonesian Seas Transport/Exchange (SITE) flow and its influence to primary Indonesian throughflow (ITF) and dynamics of South China Sea (Figure 1).

OBJECTIVES

The main objectives are (1) to measure the magnitude and its variability of the water mass transport/exchange between the Indonesian Seas and South China Sea (SCS) in the Karimata Strait; (2) to determine the effects of this flow and property flux from the tidal to seasonal variability on the circulation and mesoscale dynamics in the internal Indonesian Seas and the South China Sea.

APPROACH

- ✓ To have international collaborative research between the United States and Indonesia (Agency for Marine and Fisheries Research, BRKP) by deploying an array of three TRBM ADCPs (one from this grant the other two from our international partner) to measure the velocity, salinity, and temperature in the Karimata Strait. We plan to use Indonesian Research Vessel Baruna Jaya IV, which had been used for our previous Indonesian throughflow program.

- ✓ We plan to deploy for an 12-month period with a 6-month turn-around deployment. Each cruise will take 4-5 days. The first deployment is planned for November-2007.

- ✓ To combine with INSTANT data to determine the effects of the SITE flow and its interaction with the primary Indonesian throughflow and their consequences to stratification, upwelling and mesoscale features in the Lombok Strait and other straits to the east.

WORK COMPLETED

- The instruments (TRBM, 600kHz ADCP and extra battery, temperature and tide logger, bottom modem) have been bought and are being shipped to Jakarta, Indonesia.

- Requested to BRKP and the delivery agent in Jakarta to prepare the paper works and help on the custom clearances.

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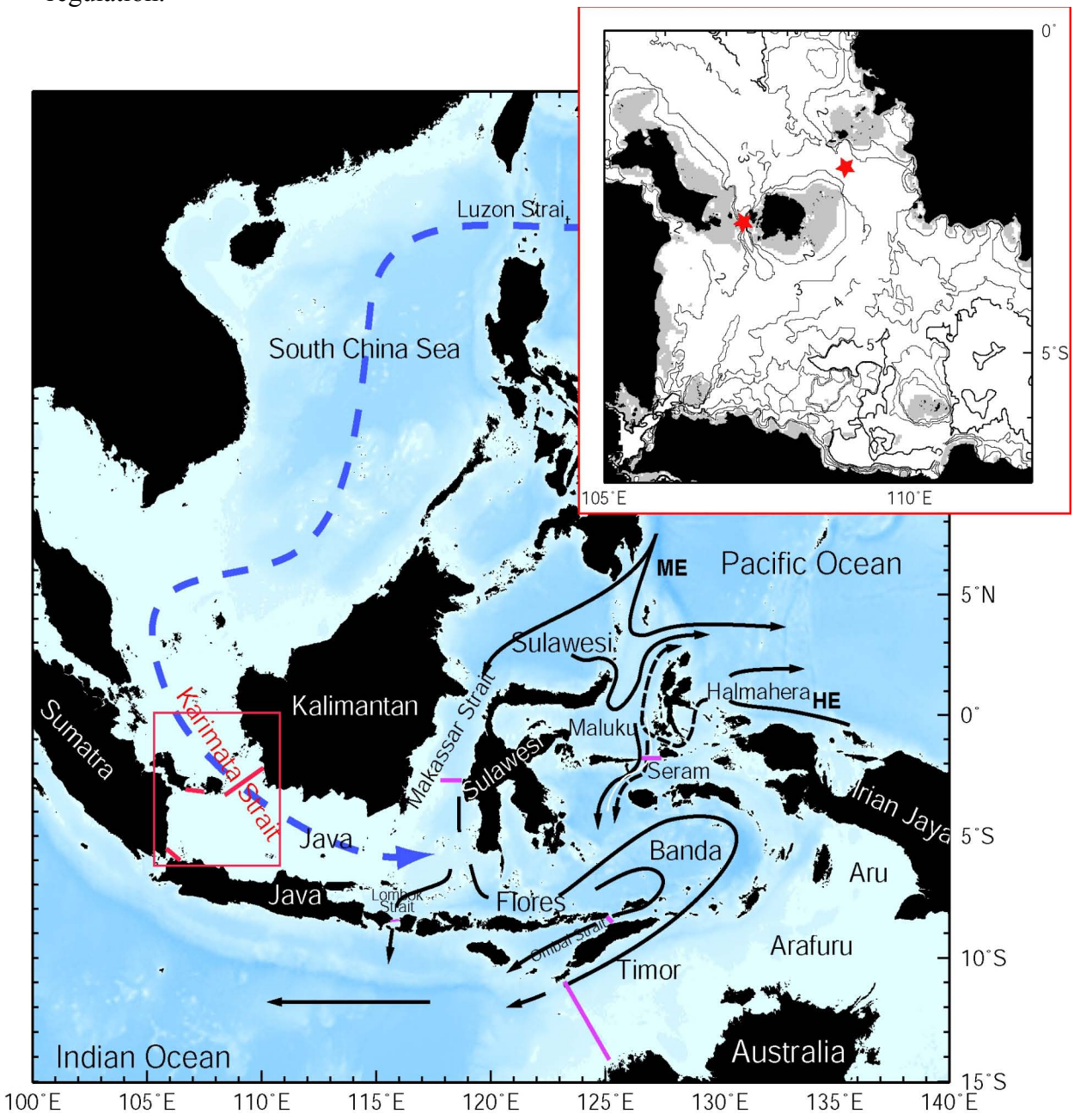
- The Sable-1200 Iridium beacon, has been returned to the manufacture because of inconsistency in sending the signal. New replacement has been sent on September 27, 2007.

- The Seabird CTD Microcat SBE27 SMP with integral pump has been ordered. I plan to carry both CTD and Iridium beacon as excess luggage. Special transport luggage has been ordered.

- Meanwhile the lithium battery plan to airfreight directly to Jakarta to follow the safety regulation.



[Figure 1. ITF pathways and INSTANT mooring locations (magenta lines) and the proposed TRBM locations in the Karimata Strait (red-stars in the insert)]

RESULTS

- A tentative date for cruise has been set for November 20 to 25, 2007 using Research Vessel Baruna Jaya IV that be operated by the Agency for Assessment and Application of Technology (BPPT).

- BPPT agreed to provide a storage space for the instruments that have been shipped until the cruise date.

IMPACT/IMPLICATIONS

Despite the importance of the Karimata Strait flow for marine shipping and industry and the significance of the water exchange on regional ocean circulation and climate, there has been no previous field measurement of this SITE flow. A strong seasonal variability of the SITE due to monsoon strongly affects the main ITF and heat-flux into the Indian Ocean. Gordon, Susanto, and Vranes (2003) suggested that Java Sea water influences the vertical velocity profile of ITF in the Makassar Strait, thereby affecting the heat flux to the Indian Ocean and their air-sea interaction. The SITE flow also affects the heat balance in the SCS, which may in turn affect cyclone/typhoon development.

RELATED PROJECT

- ✓ Ongoing multidisciplinary project supported by ONR-DRI to understand archipelago strait dynamics in the Mindoro Strait and adjacent straits within the Philippine region.

- ✓ Ongoing multidisciplinary approach supported by ONR to determine the generation, propagation, and dissipation of internal waves in the South China Sea (NLIWI).

- ✓ Ongoing project supported by NOAA to measure long-term ITF variability in the Makassar Strait as a continuation of the INSTANT program, which was supported by NSF and completed in January 2007.

- ✓ Ongoing project supported by the Chinese NSF and led by Prof. Yao-chu Yuan of the Second Institute of Oceanography, China, to deploy moorings in the Luzon Strait in November 2007 for at least one year.

- ✓ Ongoing collaborative project (China-Indonesia) to deploy moorings in the Indian Ocean south of the Sunda Strait in November 2007. Chinese PIs led by Dr. Weidong Yu of the First Institute Oceanography is supported by Chinese NSF and Indonesian PIs led Dr. Sugiarta (BRKP, Indonesia). Both of them have been my long-term collaborators.

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PUBLICATIONS

No publication has been published in this research.